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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,873	06/27/2005	Noriya Izu	274380US0PCT	1755
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER ZHAO, XIAO SI	
			ART UNIT 1792	PAPER NUMBER
			NOTIFICATION DATE 05/12/2009	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/540,873

Applicant(s)

IZU ET AL.

Examiner

XIAO ZHAO

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al. (US 5945369) in view of Hata et al. (US 6068828), Utter et al. (US 5819652) and Ishikawa et al. (US 6521671).**

Per independent claim 1:

Kimura et al. teach a catalyst for purifying exhaust gases which includes a porous support; a cerium oxide or a solid solution of a cerium oxide and a zirconium oxide which is loaded on the porous support, the cerium oxide or the solid solution has an average particle diameter of from 5 to 100 nm (see abstract). The solid solution can also be a combination of cerium oxide and a zirconium oxide (see col. 3, 10-12). The

raw material cerium oxide powder goes through a heat treatment in reducing atmosphere (col. 8, 67 to col. 9, 2). The heat treatment is in a temperature range of from 300 to 1200 °C. It is advantage to carry this heat treatment since crystalline particles of the cerium oxide release oxygen to cause oxygen deficiency therein; it is believed that the presence of oxygen deficiency further promotes the solid solution of the zirconium oxide in the cerium oxide (col. 9, 10-16). When the heat treatment is carried out, the particles of the raw material powders may grow granularly or sinter each other (col. 9, 18-19). From the first preferred embodiment, the cerium oxide is in an amount of 30% by weight and has an average particle diameter of 7 nm; after the whole process, the average particle diameter is 35 nm. The raw material powder can be dispersed in a dispersing medium such as ethanol (col. 10, 40-42). The slurry can be coated and calcinated on a support substrate (col. 4, 48-52).

Kimura et al. fail to teach dispersing agglomerated particles in the solvent, removing the precipitate, evaporating off the solvent, mixing the resulting oxide with an organic binder to obtain a paste, printing the paste onto a substrate by screen printing followed by sintering.

Hata et al. teach that zirconia is a main component that can be effectively used as sensor parts in; the zirconia is usually produced in the art in which a slurry containing zirconia powder, organic binder, and a solvent is formed into a sheet; the sheet is dried to evaporate the solvent; and then it is placed on a setter(substrate) and calcined to decompose or remove the organic binder and to sinter the ceramic powder (col. 1, 25-

35). Furthermore Hata et al. disclose that the zirconia powder can contain cerium oxide as well (col. 6, 34-49).

Utter et al. teach that screen printing of conductive paste onto unfired ceramic substrates or sheets is a well known technique in the art (col. 1, 13-15).

Ishikawa et al. teach that an ultrasonic homogenizer was used to disperse particles in a mixture (col. 13, 64-66).

It would have been obvious to one of ordinary skill in the art to incorporate the method taught by Hata et al., Utter et al., and Ishikawa et al. to Kimura et al. One would have been motivated to do this because this is a combination of prior elements according to known method to yield predictable results. In addition, Kimura et al. disclose that the cerium oxide powder can be dispersed in any desired manner into the solvent (col. 10, 45-47) thus it would have been obvious to use a ultrasonic homogenizer to disperse the particles into the solvent since this would result in well dispersed particles.

Kimura/Hata/Utter/Ishikawa does not specify that the porous thick film has an electrical conductivity of at least 10^{-3} S/m at 800° C. However, since the combination of references teach all the steps recited in the instant claim, the final porous thick film that is formed must also have an electrical conductivity of at least 10^{-3} S/m at 800° C.

Per claims 2-5, Kimura et al. did not disclose that the raw material powder is at least 10 nm but less than 45 nm; the heat treatment occurs at 880 to 920 °C after the heat treatment and that the powder is at least 45 nm after the heat treatment. However

it would have been obvious to one of ordinary skill in the art that controlling the particle diameter of cerium oxide is important since Kimura et al. disclose (col. 2, 7-15) that a cerium powder that has too large of a diameter cannot keep exhaust gases in predetermined atmosphere by storing oxygen in and releasing oxygen from the cerium oxide. Thus, manipulating the diameter of the raw material, temperature of the heat treatment (which would determine the diameter of the powder after the treatment) would have been be obvious one of ordinary skill in the art at the time of the invention to achieve a desirable final particle diameter suitable for the application to a substrate.

Per claims 6-7, Kimura et al. teach that the proportion by weight of the oxide is 10 to 30 wt% and that cerium oxide and zirconium oxide particles are used (col. 12, 16-26).

Response to Arguments

4. The claim objections and the rejection under U.S.C. 112 second paragraph are withdrawn.
5. Applicant's arguments filed 1/26/2009 have been fully considered but they are not persuasive.
 - a. Applicants argue that Kimura does not teach a porous thick film having an electrical conductivity of at least 10^{-3} S/m at 800°C. Applicant is reminded that the rejection of claim 1 was made using a combination of references. Furthermore, it is clear from Applicants' specification (page 11, lines 10-11) that the necks, which helps to generate the electrical conductivity, is a result of

sintering. Since the combination of references teach all the steps recited in claim 1 (including sintering), the final porous thick film that is formed must also have an electrical conductivity of at least 10^{-3} S/m at 800° C.

b. Applicants argue the ratio of alumina powder to oxide particles in Kimura's invention cannot produce the instantly claimed electrical conductivity; this is not persuasive because the argument is more specific than the scope of the instant claim 1. Instant claim 1 does not recite any ratio of cerium oxide to other oxides or compositions in the paste and thus claim 1 is still taught by the combination of references. In addition, Applicants assume that the alumina powder in Kimura's invention is 100% wt of pure alumina, but Kimura does not specify the exact wt% of alumina present in the powder. Furthermore, instant claim 6 recites that the oxide in the paste is 10 to 30 wt%, and Kimura (as shown in Applicants' argument) clearly teaches the oxide to be within that wt% range.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to XIAO ZHAO whose telephone number is (571)270-5343. The examiner can normally be reached on Monday to Friday 8:30 am EST to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on (571)272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Xiao S Zhao/

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Examiner, Art Unit 1792

/Michael Kornakov/
Supervisory Patent Examiner, Art Unit 1792